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Research Note

New Records, Hosts, and SEM Observations of *Cercaria owreae* (Hutton, 1954) from the Mexican Caribbean Sea

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ABSTRACT: Digenetic trematode larvae identified as *Cercaria owreae* (Hutton) were recorded in the coela of the following chaetognath species: *Flaccisagitta enflata* (Grassi), *Serratosagitta serratodentata* (Krohn), *Ferosagitta hispida* (Conant), and *Sagitta helenae* Ritter-Zahony. The hosts and parasites were collected during 4 oceanographic cruises in February, March, May, and August 1991. The low prevalence of infection (average 0.11%) was comparable with previous records. The intensity was restricted to 1 parasite. *Ferosagitta hispida* and *Sagitta helenae* are recorded for the first time as hosts of *Cercaria owreae,* and the Mexican Caribbean Sea is reported as a new locality for the geographical distribution of this parasite.

KEY WORDS: *Cercaria owreae,* SEM, scanning electron microscopy, chaetognaths, new records, Caribbean Sea, Mexico.

Cercaria owreae (Hutton, 1954) has been reported parasitizing species of *Sagitta* in the Atlantic Ocean and the Caribbean Sea (Hutton, 1952, 1954; Suárez-Caabro, 1955; Dawes, 1958, 1959). However, parasites of holoplanktonic organisms such as chaetognaths have not been studied in the vicinity of the Mexican Caribbean Sea. The main possible reasons for this lack of information are that the larval parasites have been mistaken for food remains or the holoplanktonic organisms are seldom investigated as hosts; thus, their importance as intermediate hosts has been underestimated and frequently overlooked.

The purpose of this study is to describe larvae of the digenetic trematode *Cercaria owreae* with the aid of scanning electron microscopy (SEM), to determine the prevalence and mean intensity of parasitism in chaetognaths, and to report the chaetognaths *Ferosagitta hispida* and *Sagitta helenae* as new hosts and the Mexican Caribbean Sea as a new locality record.

Zooplankton samples were collected during scientific cruises of the Mexican Navy (Secretaría de Marina) during February, March, May, and August 1991 (cruises I to IV) in the Mexican Caribbean Sea (Fig. 1). The material was intended for studies of the composition, abundance, and species distribution of the major zooplankton groups, and it was during its analysis that trematode larval parasites were observed in the coela of some chaetognaths.

Sampling was carried out from 50 m to the surface in oblique tows with a square-mouth standard net 0.45 m per side (330 μm mesh). Zooplankton material was fixed in 4% buffered (lithium carbonate) formalin. All chaetognaths were sorted from approximately 22 samples from each cruise. Prevalence and mean intensity were calculated according to Margolis et al. (1982). Parasitized chaetognaths were stained with Harris' hematoxylin and acetic carmine, cleared with methyl salicylate, and mounted on permanent slides in synthetic resin. Some chaetognaths were dissected and parasites were extracted for SEM. Twenty-two specimens were mounted on permanent slides and examined using a compound microscope, and 2 specimens were observed and photographed using SEM techniques. Measurements (mm) of 5 parasites are given as the range and mean (in parentheses).

Specimens of the parasites are deposited in the Colección Nacional de Helmintos (CNHE), Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City, under the catalogue number 3185 for parasites of *Flaccisa-*

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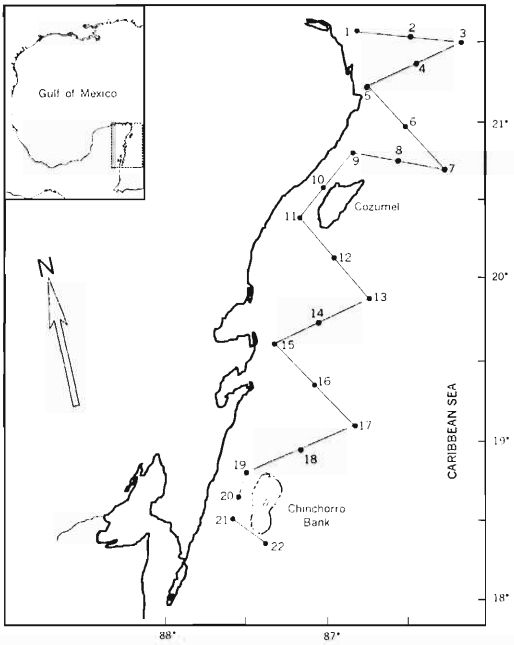

Figure 1. Study area with the locations of the stations sampled in February, March, May, and August 1991. Geographical positions of the stations were similar for the 4 cruises.

gitta enflata and number 3186 for parasites of *Serratosagitta serratodentata.* Specimens from the other 2 species were used for the SEM and are deposited in the SEM laboratory of the Instituto de Ciencias del Mar y Limnología, Universidad Nacional Autónoma de México, Mexico City.

Table 1. Prevalence and intensity of *Cercaria owreae* infecting chaetognaths from the Mexican Caribbean Sea.

Chaetognath species analyzed	*Cercaria owreae**			
	N	P	%P	I
Flaccisagitta enflata	14,583	18	0.12	1
Serratosagitta serratodentata	3,638	1	0.05	1
Ferosagitta hispida	1,015	1	0.09	1
Sagitta helenae	288	2	0.69	1

* N, total number of chaetognaths analyzed; P, total number of chaetognaths parasitized; %P, percentage of chaetognaths infected; I, intensity of parasitism.

A total of 19,524 chaetognaths (prevalence 0.11%) belonging to 4 species were analyzed: *Flaccisagitta enflata* (Grassi, 1881), *Serratosagitta serratodentata* (Krohn, 1853), *Ferosagitta hispida* (Conant, 1891), and *Sagitta helenae* Ritter-Zahony, 1911, had 1 trematode larva per host (Table 1). *Ferosagitta hispida* and *S. helenae* are reported as hosts for the first time, and the Mexican Caribbean Sea is reported as a new locality.

Cercaria owreae has an oval to pyriform body 0.166–0.575 (0.333) long and 0.087–0.235 (0.154) wide and 2 posterior cylindrical appendages 0.066–0.131 (0.107) long (Fig. 2). The tegument has deep circular furrows and dermal pa-

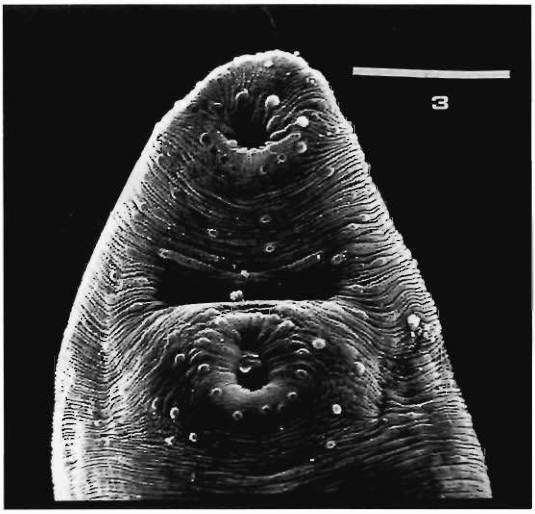

Figure 2. *Cercaria owreae*: **ventral view (SEM) of entire specimen; 1 appendage is missing. Scale 50 μm.**
Figure 3. *Cercaria owreae*: **oral and ventral suckers (SEM) showing dermal papillae. Scale 50 μm.**

pillae in the anteroventral and anterodorsal body regions extending to the acetabulum. The oral sucker, 0.041–0.079 (0.060) long and 0.041–0.1 (0.065) wide, has a subterminal mouth and is strongly muscular, with 11 papillae encircling it and another 5 distributed irregularly (Fig. 2). The acetabulum, 0.045–0.108 (0.104) length and 0.045–0.133 (0.090) width, in a preequatorial position, also has 13 papillae encircling it and 5 to 6 papillae nearby (Fig. 3). The average ratio of the diameters of the oral and ventral suckers is 1:1.7, and there is a slit-like opening anterior to the acetabulum. The muscular pharynx, which is round to oval, leads to a short esophagus and thence to a cecal bifurcation. The esophageal or cecal diverticula were not observed. The intestinal cecum is unbranched and passes into the 2 appendages. No vitelline glands or gonads were observed. The excretory vesicle is Y-shaped and does not enter the posterior appendages. Its lateral excreting tubules join together dorsally to the pharynx. The excretory pore is terminal.

Dermal papillae in the oral and ventral suckers are reported here for the first time; papillae in the anterodorsal and anteroventral body regions were reported in the family Accacoeliidae by Ödhner (1911). Subcuticular tissues from the deep fold facing the acetabulum, which are "thickenings producing small papillae," were reported by Dawes (1959), but the papillae encircling the suckers have not been reported.

Cercaria owreae has been previously reported in the Florida Current, parasitizing the chaetognaths *Flaccisagitta enflata, Flaccisagitta hexaptera* (d'Orbigny, 1836) and *Flaccisagitta lyra* (Krohn, 1853) (see Hutton, 1952, 1954) in the Caribbean Sea between Jamaica and Cuba (Dawes, 1958, 1959) and in Cuban waters in the north (Suárez-Caabro, 1955). It parasitizes *Zonosagitta pulchra* (Doncaster, 1902) northwest of Madagascar; *Serratosagitta serratodentata* var. *atlantica* and *Sagitta bipunctata* Quoy and Gaimard, 1828, in Mauritania; *F. hexaptera* in Cabo Frio and west of Mossamedes in Angola; and *F. enflata* off Gabon, Mauritania, and Liberia (Furnestin and Rebecq, 1966).

Prevalence and mean intensity values of infection in the present study were low, comparable to those obtained by Hutton (1954) and Furnestin and Rebecq (1966), even though the host species are different. To date, 7% is the highest prevalence reported (Dawes, 1959).

The parasites reported here are the smallest reported until now (0.166–0.575). The largest (0.245–2.200) were those reported by Furnestin and Rebecq (1966). These authors reported length variability between posterior appendages and body length. They noted that the perforating trematode larvae emerging from the first intermediate host (a benthic coastal mollusk) were small parasites with similarly small appendages and that both the body of the larva and the appendages would not grow proportionately.

Cercaria owreae has been found in the tropical–subtropical zones (Furnestin and Rebecq, 1966) off the coast of Miami, Florida, in the Caribbean Sea, and in the east and northwest of Africa. However, this distribution does not match that of the chaetognath species; for example, *Flaccisagita enflata* is distributed worldwide (Alvariño, 1964, 1965). No one has recorded a holoplanktonic intermediate host; thus, it seems more plausible that the *Cercaria owreae* distribution recorded until now has been determined by the initial intermediate host, the benthic mollusk (Furnestin and Rebecq, 1966).

According to Dawes (1959), *Cercaria owreae* should be placed within the genus *Accacladocoelium* Ödhner, 1928. The length of the ceca going into the posterior appendages suggests that they could correspond to the anal openings ending in the excretory vesicle walls in the case of the adult; this feature is present in several families, but it has also been observed in 7 genera of the family Accacoeliidae. Additionally, the presence of 6 diverticula in the anterior region of the intestinal ceca on each side resembles the situation in 1 of the genera of the family. Dawes (1959) mentioned that *Accacladocoelium petasiporum* Ödhner, 1928 does not belong to this trematode larval stage because this species has a conspicuous acetabulum, which does not correspond with *Cercaria owreae.* The other 3 species, *Accacladocoelium nigroflavum* (Rudolphi, 1819), *Accacladocoelium macrocotyle* (Diesing, 1858) sensu Monticelli, 1893, and *Accacladocoelium alveolatum* Robinson, 1943, remain to be studied. It is worth mentioning that these 3 species have been reported as parasites of the sunfish *Mola mola* (Linnaeus, 1758), which could indicate that *Cercaria owreae* may parasitize this fish species.

Whatever the course of discussions in relation to the taxonomic position of this trematode, the presence of papillae circling both the oral and ventral suckers in *Cercaria owreae* is a distinc-

tive feature not reported previously in any species of *Accacladocoelium*. This feature raises the possibility of an undescribed species within the genus.

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Research Note

New Host and Locality Records for Three Species of *Glypthelmins* (Digenea: Macroderoididae) in Anurans of Mexico

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ABSTRACT: During an inventory of the helminth parasites of amphibians from several localities in Mexico, trematode parasites of the genus *Glypthelmins* from 5 species of frogs were studied. Three species of *Glypthelmins* were collected from *Rana montezumae*, *Rana dunni*, *Rana neovolcanica*, *Rana megapoda*, and *Rana vaillanti*. New host and locality records for *Glypthelmins quieta* and *Glypthelmins californiensis* in anurans from Mexico are established, and we report *Glypthelmins facioi* for the first time from *R. vaillanti* from Los Tuxtlas, Veracruz State. Diagnostic characters for each parasite species and sister-group relationships are presented.

KEY WORDS: Digenea, Macroderoididae, *Glypthelmins* spp., anurans, systematics, frogs, *Rana* spp., Mexico.

The genus *Glypthelmins* was established by Stafford (1905) to include *Distomum quietum* Stafford, 1900, parasitic in *Rana catesbeiana* Shaw, 1802, *Rana virescens* Kalm, 1878, and *Hyla pickeringii* Holb, 1890, all from Canada. At the present time there is controversy about the species comprising the genus *Glypthelmins*, primarily because the original description of the type species of *Glypthelmins* was incomplete. This, and some degree of intraspecific morphological variability among some members of the genus, have led to taxonomic uncertainty concerning the species. This confusion has resulted in investigators creating nonphylogenetic groups, and some species that should be included in *Glypthelmins* were assigned to other gen-

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